Prairie Creek Mine

WASTE MANAGEMENT PLAN
ACCESS ROAD AND TRANSFER FACILITIES

April, 2012

Preamble

This *Waste Management Plan* applies to the Prairie Creek Mine access road from the Mine to the Liard Highway, including the Tetcela and Liard Transfer Facilities.

The following formal distribution has been made of this plan:

Mackenzie Valley Land and Water Board

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1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Canadian Zinc Corporation (CZN) plans to develop the Prairie Creek Mine (the Mine). The purpose of this document is to provide a Waste Management Plan for the access road from the Mine to the Liard Highway, and for the Tetcela and Liard Transfer Facilities.

The existing access road from Lindberg Landing on the Liard Highway #7 to Prairie Creek Mine (Figure 1) was constructed in 1980 and operated for 2 winter seasons. However, road re-alignments and improvements will be made. With the revised road alignment, the road terminates at the Nahanni Butte access road which itself connects to the Liard Highway. With the expansion of the Nahanni National Park Reserve (NNPR) in 2009, the road now crosses the expanded NNPR, from the Sundog Creek-Funeral Creek Pass over the Mackenzie Mountains in the west (Km 17) to Wolverine Pass in the Silent Hills in the east (Km 99).

The Tetcela Transfer Facility (TTF) will be located at approximately Km 84, inside the NNPR. The Liard Transfer Facility (LTF) will be location approximately 1 km from the Liard Highway.

Concentrates will be hauled out and fuel and operating supplies brought in on the back-haul annually. Road construction from the Mine site to the TTF will occur between November 1 and December 15, with concentrate haulage to the TTF from December 15. Construction of the road from the TTF to the Liard River ice bridge, and of the ice bridge itself, are scheduled for completion by January 15. Concentrates will then be hauled to the LTF, and operating supplies and fuel stored at the LTF hauled in. Hauling will continue to and from the Mine until road or ice bridge conditions prevent it. The LTF will continue to operate between winter seasons as concentrates are hauled out to Fort Nelson and supplies are brought in.

This Waste Management Plan (WMP) addresses the whole road operation from the Mine to the Highway, and the Transfer Facilities, rather than have separate plans for inside and outside of the Park. The Plan also considers total annual activities, including the seasonal construction, operation and closure periods. The WMP is submitted to the Mackenzie Valley Land and Water Board (MVLWB) and Parks Canada in support of land use permits.

Further project details are provided in a Project Description Report submitted by CZN to the MVLWB and Parks Canada dated February 2012.

1.2 PROJECT SETTING

The Prairie Creek Mine is located at 61º 33’ north latitude and 124º 48’ west longitude. The access road enters the park from the west at latitude 61º 36’ 36” N, longitude 124º 41’ 4” W, and

leaves the park in the east at the Wolverine (Silent Hills) Pass at latitude 61º 25’ 43” N, longitude 123º 34’ 30” W.

The TTF will be located at latitude 61º27’34” N, longitude 123º46’10” W. The LTF will be located at latitude 60 56' 56.52" N, longitude 123 06' 36.33" W.

The Mine is situated adjacent to Prairie Creek about 48 km upstream from its confluence with the South Nahanni River, and 7 km upstream of the point where Prairie Creek crosses the boundary of the expanded Nahanni National Park Reserve.

The mine site is at an elevation of 850 m above sea level, and is situated in topography characterized by low mountains and narrow valleys with an average relief of 300 m. Short summers are typical of the area’s sub-arctic climate, where the mean annual temperature is -5ºC. Annual precipitation is approximately 40 cm, most of which falls as rain.

1.3 WASTE OVERVIEW

Road and Transfer Facility activities will produce very little waste on an annual basis. Road construction crews will likely use portable day trailers and accumulate modest volumes of domestic waste and sewage. The Transfer Facilities will do the same, although the LTF may accumulate somewhat more because of the greater intensity and period of use. The intent will be to temporarily store these wastes for regular collection and transport to the Mine for disposal and/or treatment. The same will be true for any inert or hazardous waste, lead acid batteries for example. Any soil or granular material contaminated with hydrocarbons would also be transported to the Mine where operation of a bioremediation cell is planned.

During the initial road construction including new alignments, if any material is excavated that is subsequently determined to be of questionable geochemical content (e.g. mineralized rock), this material will also be brought to the Mine and managed with other similar material.

CZN’s policy is to minimize the production of waste, and avoid the release of waste to the environment by appropriate collection and disposal strategies.

2.0 WASTE TYPES

2.1 DOMESTIC WASTE

Domestic waste produced during road construction and operation (maintenance), and during operation of the Transfer Facilities, will consist of packaging, tins, food scraps and drink containers. Production sources will be from trailers that are moved along the road during road construction, and at the Transfer Facilities where some personnel will stop for a few hours or overnight (LTF only), and some will work a regular shift.

One road construction crew of approximately 10 people will work from each end of the road during construction season. Domestic waste is assumed to be produced at a rate of 2.64 kg/person/day (0.011 m^3/day, 240 kg/m^3). However, the 20 people in the crews will be on a 12 hour shift, and therefore will equate to 10 people for waste production calculation, which is estimated at 26.4 kg/day. Road maintenance crews will involve slightly less people, and therefore less domestic waste will be produced.

When the TTF is in operation, there will be 2-3 operators each shift, and 2 shifts. In addition, approximately 20 trucks will be arriving to off-load or pick-up twice per day, meaning 40 stops per day. The number of stops may approach double when the full length of the road is open and Mine and contractor trucks are in operation. This activity at a maximum will be roughly equivalent to 7 people being at the TTF 24 hours/day. Therefore, total maximum domestic waste production at the TTF will be approximately 18.5 kg/day.

LTF operations will vary in intensity. When the access road is not in operation but the LTF is being used to either ship out concentrates or receive supplies, there will be 2-3 operators each shift, potentially 2 shifts, and up to approximately 12 trucks arriving to off-load or pick-up daily. This activity at a maximum will be roughly equivalent to 4 people being at the LTF 24 hours/day. Therefore, total maximum domestic waste production will be approximately 10.6 kg/day. When the access road is open, Mine and contractor trucks will be arriving from the access road, as well as trucks from the Liard Highway. In addition, some contract drivers will use trailers on site for rest between shifts. This activity at a maximum is assumed to be roughly equivalent to 15 people being at the LTF 24 hours/day. Therefore, total maximum domestic waste production at that time will be approximately 39.6 kg/day.

2.2 SEWAGE

The ‘rule of thumb’ used to estimate sewage (black and grey water) production is 270 L/person/day. Using the personnel data above, sewage volumes are estimated as follows:

- Road construction and maintenance - 10 x 270 = 2,700 L/day
- TTF - 7 x 270 = 1,890 L/day
- LTF, access road closed - 4 x 270 = 1,080 L/day
- LTF, access road open - 15 x 270 = 4,050 L/day

These are likely to be over-estimates because a significant portion of the daily estimate will be shower water, and there may only be limited shower use at the LTF, or none at all. Personnel

will mostly be accommodated either at the Mine or Nahanni Butte (LTF staff). Contract truck drivers between shifts may use temporary accommodations.

2.3 EXCAVATED MATERIAL

Re-alignments to the access road are planned. Figure 2-2 shows the existing road alignment, re-alignments and regional geology. Construction of the re-alignments will involve some ground levelling to make the road bed, and side hill cuts. This may generate a limited quantity of excavated material, which is expected to be organic material and mineral (granular) soil. The organic material will be stockpiled local to the excavation source for use in reclamation. The mineral soil will likely all be consumed in road bed preparation, particularly where permafrost may exist and require insulation.

The Polje Re-alignment is approximately 9 km in length and inside the NNPR. The underlying bedrock is either the Fort Simpson or Nahanni Formation, which are predominantly limestone and shale units respectively. The majority of the expected side hill cuts will be where the road overlies the Fort Simpson Formation. Therefore, the excavated material may be clay-rich and unsuitable as fill. If this is the case, the material will be taken to the mine site for later use in reclamation.

The road switch-backs on the west side of the Silent Hills (inside the NNPR) are to be revised. The underlying rock is the Upper Devonian unit, consisting of shales, mudstones or siltstones. However, very little excavation is expected to be required.

The Wolverine Pass-Grainger Gap Re-alignment is approximately 16 km in length, and the underlying bedrock is either the Upper Devonian unit or Fort Simpson Formation. Again, very little excavation is expected to be required.

The Front Range Re-alignment is approximately 43 km in length, and the underlying bedrock is Mesozoic shales, mudstones or siltstones, although rock exposure is rare. Very little excavation is expected in predominantly soil/muskeg material.

2.4 MISCELLANEOUS

Despite best efforts to the contrary, potential will exist for small volumes of soil contaminated with hydrocarbons due to standing vehicles or machinery, and drips/leaks from storage vessels. This is more likely at the LTF due to contractor and supply vehicles. The contaminants are likely to be diesel fuel and lubricating oil.

Other items, such as lead acid batteries, may be part of the overall waste stream requiring management. Waste from potential spills will be addressed in a *Spill Contingency Plan*.

3.0 WASTE MANAGEMENT

3.1 DOMESTIC REFUSE

Domestic waste will be stored temporarily in their locations of generation until removal. Road crews working from the Mine will return the waste to the mine. Crews working from the LTF will return the waste to the LTF. During TTF operation, waste will also be taken to the mine. Domestic refuse transported to the Mine will be managed with the Mine stream and incinerated, except for plastics which will be separated and stored for periodic removal to an off-site recycling/disposal facility, likely in Fort Nelson. Domestic refuse transported to the LTF will be removed to a disposal site in Fort Nelson.

3.2 SEWAGE

The mobile trailers for road construction/maintenance and the Transfer Facilities will have tanks for the collection of sewage. The tanks will be pumped out as required and the sewage taken to a suitable treatment plant. The preference will be to take the sewage to the Mine's Sewage Treatment Plant. However, when the LTF is in operation and the road isn't, this will not be possible. In this case, the sewage will be taken to a plant in Fort Nelson.

3.3 EXCAVATED MATERIAL

During the construction of the road re-alignments, excavated material will be examined for any evidence of mineralization or discolouration which might indicate elevated metals content. Any suspect material will be separated and stored temporarily until further examination and/or testing has been completed. If it is subsequently determined that the material is of questionable geochemical content, it will be brought to the Mine and managed with other similar material in the Waste Rock Pile (WRP).

It should be noted that the chances of encountering material as described above is considered to be slim because no indications of mineralization have been noted in proximity to the re-alignments, and the excavations will be shallow and mostly in highly weathered soil deposits. It is considered more likely that clay-rich soil that is unsuitable as fill will be transported to the Mine for use/disposal.

3.4 MISCELLANEOUS

Any soil contaminated with hydrocarbons will be taken to the Mine site and remediated in a cell to be built in the solid waste management area near the WRP.

Any hazardous waste, such as lead acid batteries, will be managed with the Mine's stream, and taken out of the area for disposal by a licenced contractor.